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ical processes in plants and is here presented. Following the treatment of the Spermatophytes in the manner indicated is work on the great groups of plants. There will be some who will take exception to the choice of types. *Marchantia*, for example, is a very antiquated and highly respectable laboratory type and possesses historical inertia, but it is hardly the best possible representative of the Hepaticæ. Concerning these outlines it may be said that only the broad lines are laid down, and plenty of work is left for the teacher to do in intelligently planning the details of the laboratory work. The most valuable and distinctive feature in this portion of the book is the discussion of the pedagogics involved in each stage of the course. These must be passed with bare mention, though they deserve full treatment.

It is satisfactory to know that morphological study is considered of great value in the training of students and that the diagrammatic rather than the artistic representation should be required.

A few inadvertencies have crept in. Longitudinal sections of a *Scilla* or *Hyacinth* flower passing through two stamens will not give an appearance of the ovary as represented in pages 239 and 240, as such sections would pass through one of the partitions. It is not at all certain that the willow flower is theoretically primitive, and much more uncertain is it that 'color develops \* \* \* to show where the nectar is.' Insects at least, it appears, are probably color-blind, but possess a keen sense of smell. And it is to be hoped that the essay on page 175 will not be read as an example without drawing attention to the incorrect use of the word 'endosperm,' for which 'food materials' would better be substituted.

Altogether, however, we have in Professor Ganong's book a very useful and timely work, which will surely do a great deal towards the bettering of botanical teaching in the schools, and one, moreover, as unique as useful.

FRANCIS E. LLOYD.

TEACHERS COLLEGE.

*Reye's Geometrie der Lage. Lectures on Geometry of Position.* By THEODORE REYE, Professor of Mathematics in the University of Strassburg. Translated by THOMAS F. HOLGATE,

M.A., Ph. D., Professor of Applied Mathematics in the College of Liberal Arts in Northwestern University. New York, The Macmillan Company. 1898. Part I., 8vo. Pp. xix + 248.

As is well known this book, of which the first edition was published not more than thirty years ago, is the outgrowth of lectures delivered before the engineering students in the Polytechnic school at Zürich. These students were later to take lectures on Graphical Statics by Professor Culmann who, in the treatment of his subject, made free use of Von Staudt's 'Geometrie der Lage.' To get the most out of Culmann's work it was necessary that the student should not only be well acquainted with the conics, quadric surfaces, etc., but that he should also have what may be called a well-cultivated geometric imagination, in order that he might easily realize for himself a clear mental picture of the space figures which play such an important part in the engineer's work.

It is hardly too much to say that for the special purpose he had in view, no better means than the projective geometry could have been employed by Professor Reye; and one who has read his masterly treatment of the subject must always be grateful to him for the pleasure and profit derived therefrom.

It seems to us that there is a rapidly growing interest in pure geometry in this country, and that its real merit as an instrument of education is coming to be more fully recognized. Rightly presented, the charm of the subject itself, which is free from the trammels of the metric geometry of Euclid, is immediately experienced by students.

Although the geometry of position is often introduced by means of cross ratios, which (at least apparently) involve measurements, yet Reye's treatment is entirely free, even at the beginning, from any dependence upon metric relations. He has, however, beautifully shown that metric relations, especially those connected with the conic sections, present themselves very naturally as special cases of general non-metric theorems.

This, of course, may also be said of two other excellent books, viz., Cremona's 'Projective Geometry' and Von Staudt's 'Geometrie der Lage'; but Von Staudt is too brief to be easily

read by a beginner, and Cremona, as translated by Leudesdorf, seems rather unattractive, and certainly lacks the charm of Reye's lucid style.

It seems to us, therefore, that the translator has rendered a great service to English-speaking students in translating this first part of Reye, and we earnestly hope that sufficient interest in the study of pure geometry will be awakened by having this very attractive book available for beginners, to make him feel that his unselfish labor has not been in vain.

Whether it is worth while to translate the other parts also (Parts II. and III. carry the subject far beyond its elements) is, however, very questionable—because those of our students who are sufficiently advanced to understand the subjects treated are able to read the German about as readily as the English.

The translation itself is also, as a whole, to be heartily commended; the charm of the original has been preserved, many valuable exercises have been added, and the breaking up of the lectures into numbered paragraphs, as well as the rearrangement of the exercises so as to have those that are appropriate thereto follow each lecture, are distinct improvements.

It is, however, to be greatly regretted that the translator has seen fit to change a well-established and everywhere understood terminology. For example, he replaces the terms *pencil* and *sheaf* (which are already, and for many years have been, well-nigh universally employed to represent particular geometric concepts), respectively by the terms *sheaf* and *bundle*. While it may be granted that these new terms are in themselves just as good as, and possibly even a trifle better than, those for which they are substituted, yet nothing of importance is gained by the change, while the danger of confusion and misunderstanding is greatly increased.

J. H. TANNER.

CORNELL UNIVERSITY, October 4, 1899.

#### BOOKS RECEIVED.

*Bacteria.* GEORGE NEWMAN. New York, G. P. Putnam's Sons. London, John Murray. 1899. Pp. xiv + 348.

*Cambridge Natural History.* Vol. V. *Insects.* Part II. DAVID SHARP. London and New York, The Macmillan Company. 1899. Pp. xii + 626.

*A Dictionary of Birds.* ALFRED NEWTON, assisted by HANS GADOW. New York, The Macmillan Company. London, Adams & Charles Black. 1893-1896. Cheap issue, unabridged. Pp. iii + 1088. \$5.00.

*The Insect World. A Reading Book of Entomology.* CLARENCE MOORES WEED. New York, D. Appleton and Company. 1899. Pp. xvi + 210.

*Indicators and Test-Papers.* ALFRED I. COHN. New York, John Wiley & Sons. London, Chapman & Hall, Ltd. 1899. Pp. ix + 249.

*A System of Medicine by] Many Writers.* Vol. VIII. *Diseases of the Nervous System.* Continued. Edited by THOMAS CLIFFORD ALLBUTT. New York and London, The Macmillan Company. 1899. Pp. xii + 937. \$5.00.

#### SCIENTIFIC JOURNALS AND ARTICLES.

*The Journal of Physical Chemistry*, October, 'On the Paraanisaldoximes,' by H. R. Carveth: a study of the two modifications; 'On the Relation between Pressure and Evaporation,' by Edwin H. Hall; 'The Electrical Conductivity of Non-Aqueous Solutions,' by Azariah T. Lincoln: an account of the experimental work of the author, chiefly with chlorides (also silver and lead nitrates, silver and mercuric cyanids, mercuric iodid and copper sulfate), in a well-selected variety (27) of solvents, all organic except  $\text{PCl}_3$  and  $\text{SuCl}_4$ . Some substances were insoluble, some insoluble but not conductors of electricity, while others conducted electricity well. Two conclusions of the author may be quoted: "The data collected are as yet insufficient to show what the relation between solvent and dissolved substance must be in order to yield solutions that conduct electricity." "The dissociation theory as promulgated for the explanation of the electrical conductivity of aqueous solutions, apparently cannot be applied in its present form to explain the conductivity in non-aqueous solutions." The article is an important contribution to the study of solutions.

J. L. H.

#### SOCIETIES AND ACADEMIES.

NEW YORK ACADEMY OF SCIENCES. SECTION OF BIOLOGY.

THE regular meeting of the Section of Biology was held on Monday evening, October 9th, Professor Frederic S. Lee presiding. The